DEPARTMENT OF THE ARMY TECHNICAL MANUAL
DEPARTMENT OF THE NAVY MANUAL
DEPARTMENT OF THE AIR FORCE MANUAL
UNITED STATES COAST GUARD MANUAL
FEDERAL AVIATION ADMINISTRATION HANDBOOK

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UNITED STATES INTERAGENCY GROUND INSPECTION MANUAL

AIR TRAFFIC CONTROL AND NAVIGATIONAL AID FACILITIES

APRIL 1967

DEPARTMENTS OF THE ARMY, THE NAVY, AND THE AIR FORCE
THE UNITED STATES COAST GUARD
AND THE FEDERAL AVIATION ADMINISTRATION

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3			37			71			105		
4			38			72			106		
5			39			73			107		
6			40			74			108		
7			41			75			109		
8			42			76			110		
9			43			77			111		
10			44			78			112		
11			45			79			113		
12			46			80			114		
13			47			81			115		
14			48			82			116		
15			49			83			117		
16			50			84			118		
17			51			85			119		
18			52			86			120		
19			53			87			121		
20			54			88			122		
21			55			89			123		
22			56			90			124		
23			57			91			125		
24			58			92			126		
25			59			93			127		
26			60			94			128		
27			61			95			129		
28			62			96			130		
29			63			97			131		
30			64			98			132		
31			65			99			133		
32			66			100			134		
33			67			101			135		
34			68			102			136		

DEPARTMENT OF THE ARMY TECHNICAL MANUAL — TM 11-2557-28
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UNITED STATES INTERAGENCY GROUND INSPECTION MANUAL

AIR TRAFFIC CONTROL AND NAVIGATIONAL AID FACILITIES

FIRST EDITION

DEPARTMENTS OF THE ARMY, THE NAVY, AND THE AIR FORCE
THE UNITED STATES COAST GUARD
AND THE FEDERAL AVIATION ADMINISTRATION

FOREWORD

The purpose of this manual is to prescribe standardized criteria for interagency use in determining and certifying the technical performance of certain military-maintained air traffic control and navigational aid facilities designated for use in the National Airspace System. Further, the prescribed criteria shall be used in determining the technical performance of all air navigation facilities maintained and operated by a military service when specifically directed by an appropriate regulation, notice, etc. These criteria essentially comprise the technical performance standards and tolerances for application at the various facility types. Guidance regarding those maintenance procedures requiring subsequent flight inspections, and procedures to be followed in ground inspecting and certifying facilities and in issuing Notices to Airmen are also furnished. This manual is not intended as authorization for an agency to assume ground inspection authority over any group of facilities which are not now under its jurisdiction. Similarly, it carries no designation of responsibility within any agency unless such has been so designated in its usual procedural manner, such as general orders, regulations, etc.

This manual is directive upon all personnel charged with the responsibility for the ground inspection of military-maintained air traffic control and navigational aid facilities used in the National Airspace System, when a facility is so designated by its agency. Compliance with this manual, however, is not a substitute for common sense and sound judgment. Nothing in this manual shall be construed to relieve maintenance or supervisory personnel of the responsibility of exercising initiative in the execution of their program, or from taking such emergency action as the situation warrants.

The Federal Aviation Administration will coordinate and provide approved changes to this manual by means of a page revision method. Revised pages will be transmitted by Federal Aviation Administration Change. Recommendations concerning changes or additions to the subject material are welcomed and should be forwarded to one of the following addresses:

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Chief of Staff, U.S. Air Force, Washington, D.C. 20330
Commandant, U.S. Coast Guard, 1300 E Street NW., Washington, D.C. 20004
Administrator, Federal Aviation Administration, Washington, D.C. 20590

This manual has been officially approved by: Chief of Staff, U.S. Army; Chief of Naval Operations, U.S. Navy; Chief of Staff, U.S. Air Force; Commandant, U.S. Coast Guard; and the Administrator of the Federal Aviation Administration. The effective date of the manual shall be the date of signature of the last signatory agency.

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UNITED STATES INTERAGENCY GROUND INSPECTION MANUAL

AIR TRAFFIC CONTROL AND NAVIGATIONAL AID FACILITIES

TABLE OF CONTENTS

100 General

200 Technical Performance Standards and Tolerances

* 300 Facility Ground Inspection and Notice to Airmen Procedures

400 Appendix

UNITED STATES INTERAGENCY GROUND INSPECTION MANUAL

AIR TRAFFIC CONTROL AND NAVIGATIONAL AID FACILITIES

100 General

101 Introduction

The phenomenal growth of air traffic operations has caused the establishment of a complex system of air traffic control and navigation facilities to enable large numbers of aircraft to move efficiently and safely to their destinations. This system includes FAA, military, and privately owned (non-federal) facilities. Safety of flight and effective control of aircraft movements necessitate that the components of this system be accurate and reliable. Facilities are flight inspected in accordance with criteria in the United States Standard Flight Inspection Manual, OA P 8200.1. A dynamic maintenance program coupled with recurring ground inspections of air traffic control and navigational aid facilities by trained technical personnel in accordance with appropriate technical performance standards and tolerances will assure the continued accuracy and reliability of the system. In addition, such a program will minimize flight inspection requirements.

102 Reserved
103 Reserved
104 Reserved

200 Technical Performance Standards and Tolerances

200.1 Introduction

The technical performance standards and tolerances prescribed by this manual set forth the minimum acceptable performance which a facility * must meet to be certificated for use, or used, in the National Airspace System. Further, when specifically directed by an appropriate regulation, notice, etc., the prescribed performance standards and tolerances of this manual shall be utilized in determining the technical performance of all air navigation facilities maintained and operated by a military service. An appropriate Notice to Airmen shall be issued on any facility later found not to be performing within these standards and tolerances. Pending correction and recertification, the facility shall not be used in the National Airspace System. Facilities * may be maintained in accordance with established maintenance procedures, applicable technical orders, instruction books, and/or other directives so long as performance meets the standards and tolerances prescribed herein.

200.2 Definitions

Definitions of standard, initial tolerance and operating tolerance for the purpose of this handbook are as follows:

a. *Standard:* The optimum value assigned to an essential parameter of the equipment or system to obtain normal operating performance.

b. *Initial Tolerance:* The maximum deviation, from the *standard* value of the parameter, which is permissible at the time of initial tune-up or a major readjustment.

c. *Operating Tolerance:* The maximum deviation, from the *standard* value of the parameter, beyond which remedial action is mandatory.

200.3 Explanation of Terminology

Each essential equipment parameter has been assigned a standard value, which, by definition, is the optimum value which will provide normal operating performance. These standard values are compatible with the design capability of the equipment involved, and, from a systems engineering viewpoint, with normal operation of the overall system of which it is a part.

In addition, each essential equipment parameter has been assigned an "initial" and an "operating" tolerance expressed in terms of the permissible deviation from the "standard" value, or in absolute maximum and/or minimum performance levels, as appropriate.

The initial tolerances are those limits within which an equipment must operate in order to be * certificated and accepted for use in the National * Airspace System at the time of initial commissioning or after a major overhaul, modification or modernization.

The operating tolerances are those limits which are acceptable in terms of meeting system requirements, and within which an equipment may continue to operate on a certified basis without adjustment or corrective maintenance.

200.4 Modifications

Army, Navy, Air Force, or Coast Guard equipment or facilities may be modified or altered only in accordance with current directives issued by the cognizant agency. In addition, any modifica- * tion or alteration which will affect the certificated * operating performance of any military-maintained equipment or facility that has been designated for use in the National Airspace System must be coordinated with the Washington Headquarters, FAA for concurrence prior to the modification being made, except as follows:

(1) The above requirement for coordination shall not be construed to inhibit the accomplishment of normal equipment maintenance and repair which shall be coordinated in accordance * with the Notice to Airmen Procedures contained * in paragraph 302.

(2) It is recognized also that there will be occasions when certain temporary alterations or modifications will be necessary due to an emergency situation, or for the development or test of equipment or system improvements. In these cases, coordination shall be accomplished as follows:

(a) Any necessary alteration or modification required in an emergency situation may be coordinated directly with the designated FAA Maintenance Liaison Officer (MLO) responsible for the affected facility. Equipment affected by these changes will be returned to its original configuration at the earliest practica ldate.

(b) The temporary alteration or modification of a single equipment for test purposes or to determine the feasibility of a proposed improvement may be coordinated directly with the cognizant FAA Regional authority. The test period should be limited to that time required to obtain sufficient data for a fully documented analysis. After completion of the test, the equipment will be returned to its original configuration, or a fully documented request for approval as a permanent modification shall be submitted to the cognizant Military Headquarters for coordination with Washington Headquarters, FAA as required above.

201 VHF Omnidirectional Radio Range (VOR/TVOR)

201.1 Description

VOR (Very High Frequency Omnidirectional Range) operates in the 108 to 118 MHz band. It provides omnidirectional azimuth information to an aircraft for short range enroute air navigation. Identification is provided by a keyed 1,020 Hz tone, supplemented at some stations by voice recording. Voice may be provided for communications from ground to air. Monitoring is provided for course alignment and signal output from the station by means of detector units mounted external to the radiation system.

201.2 Tabulation of Standards and Tolerances

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(1) Frequency Tolerances:			
(a) Transmitter frequency	Assigned Frequency	±0.005%	Same as initial.
(b) VOR Goniometer Supply Frequency	50 or 60 Hz (depending) upon equipment design).	±1%	Do.
(c) Frequency of 1,020 Hz Oscillator	1,020 Hz	±25 Hz	±50 Hz.
(d) Audio Response Requirements for Voice Frequencies.	Flat between 300 and 2,000 Hz.	The sine-wave audio response characteristics of the system with reference to the frequency of maximum response shall be within 6 dB between 300 Hz and 2,000 Hz.	Same as initial.
(2) Modulation Levels:			
(a) Reference Signal Modulation	30%	29 to 31%	28 to 32%.
(b) Variable Signal Modulation	30%	29 to 31%	28 to 32%.
(c) Code Identification (1,020-Hz)	8%	7 to 9%	6 to 10%.
(d) Voice Identification (400-Hz sine wave).	28%	27 to 29%	26 to 30%.
(e) Voice Broadcasts (400 Hz sine wave)	28%	27 to 29%	26 to 30%.
(f) Residual Amplitude Modulation in the Modulation Eliminator.	0	Less than 5%	Less than 5%.

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(3) Monitor System Tolerances:			
(a) Course Shift (phase alarm)	The monitor shall alarm for course shifts in excess of ± 1 degree.	Same as standard	Same as standard.
(b) Reference Level Alarm Tolerances	13% decrease	12 to 14% decrease	11 to 15% decrease.
(c) Variable Level Alarm Tolerances	13% decrease	12 to 14% decrease	11 to 15% decrease.

(4) Ground Check:

(a) The facility must meet the following ground check tolerances when recertification is by ground check:

1. Monitor azimuth indication taken within a 15-minute period shall not vary more than 0.3 degree.

2. Ground check error curves shall not deviate from the reference ground check error curve in excess of 1 degree. The reference ground check error curve is the average of three successive error curves taken immediately following a basic altitude flight inspection, not varying more than 0.3 degree from each other.

3. The maximum error spread of any ground check error curve shall not exceed 2 degrees.

4. The ground check error curves for dual transmitter facilities shall not deviate from each other by more than 1 degree.

(b) The facility must meet the ground check tolerances indicated above when recertification is by flight inspection, with the following exceptions:

1. The maximum error spread of any ground check error curve shall not exceed 4 degrees.

2. The ground check error curves for dual transmitter facilities shall not deviate from each other by more than 1.5 degrees.

201 VHF Omnidirectional Radio Range (VOR/TVOR)

201.1 Description

VOR (Very High Frequency Omnidirectional Range) operates in the 108 to 118 MHz band. It provides omnidirectional azimuth information to an aircraft for short range enroute air navigation. Identification is provided by a keyed 1,020 Hz tone, supplemented at some stations by voice recording. Voice may be provided for communications from ground to air. Monitoring is provided for course alignment and signal output from the station by means of detector units mounted external to the radiation system.

201.2 Tabulation of Standards and Tolerances

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(1) Frequency Tolerances:	Assigned Frequency	±0.005%	Same as initial.
(a) Transmitter frequency	50 or 60 Hz (depending upon equipment design).	±1%	Do.
(b) VOR Goniometer Supply Frequency.			
(c) Frequency of 1,020 Hz Oscillator	1,020 Hz	±25 Hz	±50 Hz.
(d) Audio Response Requirements for Voice Frequencies.	Flat between 300 and 2,000 Hz.	The sine-wave audio response characteristics of the system with reference to the frequency of maximum response shall be within 6 dB between 300 Hz and 2,000 Hz.	Same as initial.
(2) Modulation Levels:			
(a) Reference Signal Modulation	30%	29 to 31%	28 to 32%.
(b) Variable Signal Modulation	30%	29 to 31%	28 to 32%.
(c) Code Identification (1,020-Hz)	8%	7 to 9%	6 to 10%.
(d) Voice Identification (400-Hz sine wave).	28%	27 to 29%	26 to 30%.

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(e) Voice Broadcasts (400 Hz sine wave).	28%	27 to 29%	26 to 30%.
(f) Residual Amplitude Modulation in the Modulation Eliminator.	0	Less than 5%	Less than 5%.

(3) Monitor System Tolerances:

(a) Course Shift (phase alarm)	The monitor shall alarm for course shifts in excess of ±1 degree.	Same as standard	Same as standard.
(b) Reference Level Alarm Tolerances	13% decrease	12 to 14% decrease	11 to 15% decrease.
(c) Variable Level Alarm Tolerances	13% decrease	12 to 14% decrease	11 to 15% decrease.

(4) Ground Check:

(a) The facility must meet the following ground check tolerances when recertification is by ground check:

1. Monitor azimuth indication taken within a 15-minute period shall not vary more than 0.3 degree.

2. Ground check error curves shall not deviate from the reference ground check error curve in excess of 1 degree. The reference ground check error curve is the average of three successive error curves taken immediately following a basic altitude flight inspection, not varying more than 0.3 degree from each other.

3. The maximum error spread of any ground check error curve shall not exceed 2 degrees.[1]

4. The ground check error curves for dual transmitter facilities shall not deviate from each other by more than 1 degree.

(b) The facility must meet the ground check tolerances indicated above when recertification is by flight inspection, with the following exceptions:

1. The maximum error spread of any ground check error curve shall not exceed 4 degrees.

2. The ground check error curves for dual transmitter facilities shall not deviate from each other by more than 1.5 degrees.

[1] The maximum error spread of any ground check error curve for the Wilcox, La Voie, Collins, Lorenz, and Mobile systems shall not exceed three degrees.

201.3 Flight Inspection Requirements

201.31 A flight inspection will be required if a VOR facility does not meet the ground check tolerances outlined in Section 201.2(4)(a) after the following maintenance activities are performed:

(1) Replace or reposition any fixed field detector, or replace or modify any evaluating element in the VOR monitor system if the signal level or course indication was abnormal immediately before and immediately after this work was accomplished.

(2) Repair or replace goniometer.

(3) Adjust or replace any of the following: (a) RF transmission lines, including feed lines, stubs, positioners, bridges; (*b*) antennas and components, including pedestals, loops, baluns, supporting braces.

201.32 A flight inspection will be required, regardless of ground check results, after the following maintenance activities are performed:

(1) Perform modernization or corrective maintenance of a major nature such as modification of the counterpoise.

(2) Following new construction in the vicinity such as sheds, hangars, water tanks, fences, grading, utility lines, etc., which may create conditions not detectable by ground observation.

(3) Change operating frequency of facility.

202 Instrument Landing System (ILS)

202.1 Description

The instrument landing system is designed to provide an approach path for exact alignment and descent of an aircraft on final approach to a runway. The system usually consists of a localizer, glide slope and one or more markers, compass locators and various lighting systems. The standards set forth herein cover the localizer and glide slope only. Markers and compass locator standards are given under the 75 MHz Marker Equipment and Low Frequency Homing Beacon sections respectively.

Localizer—Localizer facilities radiate field patterns of 90- and 150-Hz modulated energy on opposite sides of the instrument runway to provide a course for guidance in the horizontal plane. The 90-Hz energy predominates to the left side of an aircraft on final approach when the aircraft is "on course."

Glide Slope—Glide slope facilities radiate field patterns of 90- and 150-Hz modulated energy to provide a path for guidance in the vertical plane. The 90-Hz energy predominates above an aircraft on final approach when the aircraft is on the correct glide path angle.

202.2 Tabulation of Standards and Tolerances

202.21 Localizer

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(1) RF Frequency	Authorized	±0.003% [1]	±0.005%.[1]
(2) RF Power Output	Rated output or 180 watts, whichever is less.	80% of std., min	75% of std., min.
(3) Modulation:			
(a) 90 Hz and 150 Hz	20%	19 to 21%	18 to 22%.
(b) 1,020 Hz (if applicable)	5%	4.5 to 5.5%	4 to 6%.
(c) Voice (peak) (if applicable)	50%	48 to 52%	45 to 55%.
(4) Monitor:			
(a) Power Reduction Alarm:			
1. Standard Localizer Transmitter.	45% reduction	43 to 47% reduction	40 to 50% reduction.
2. Waveguide Clearance Array Transmitter.	20% reduction	18 to 22% reduction	15 to 25% reduction.
3. Waveguide Array Transmitter	20% reduction	18 to 20% reduction	16 to 20% reduction.
(b) Course Shift Alarm	1/20th (5%) of commissioned width.[2]	75% of std., min	60% of std., min.
(c) Course Width Alarm (percent of established width).	15%	13 to 17%	10 to 20%.

[1] Where two radio frequency carriers are used, the initial tolerance shall not exceed ±0.001% and the operating tolerance shall not exceed ±0.002% with the frequencies symmetrical about the assigned frequency.

[2] Except when designated otherwise by the Flight Inspector for a specific facility.

202.22 Glide Slope

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(1) RF Frequency	Assigned frequency	±0.003%	±0.005%.
(2) Power Output	Rated output	80% of std., min	75% of std., min.
(3) Modulation:			
(a) 90 Hz trough	80%	79 to 81%	78 to 82%.
(b) 150 Hz trough	80%	79 to 81%	78 to 82%.
(c) 90/150 Hz equality	Equal	±0.5%	±1%.
(4) Monitor:			
(a) Power Reduction Alarm	45 reduction	43 to 47% reduction	40 to 50% reduction.
(b) Path Shift Alarm [3]	±0.2°	±0.2°	±0.2°.
(c) Path Width Alarm	±0.2°	±0.2°	±0.2°.

[3] Except that, at facilities whose operating path angle is less than 2.67°, the tolerance shall be 0.075 times the angle.

202.3 Flight Inspection Requirements

202.31 Localizer

A flight inspection will be required when any of the following conditions exist:

(1) Major changes in local airport obstructions, buildings, etc., which may affect the radiated localizer course or clearance structure.

(2) When airport construction, runway repairs, etc., are being performed in the general localizer area without a facility shutdown and any doubt of facility reliability exists.

(3) Critical component modification or replacement, including transmitters as units, bridges, motor alternators, phasers, transmission line and antennas.

(4) Antenna, repair and repositioning.

(5) Removal of equipment to accomplish site check and reinstallation of that set of equipment.

202.32 Glide Slope

A flight inspection will be required when any of the following conditions exist:

(1) Major changes in local airport obstructions, buildings, etc., which may affect the radiated glide slope path structure.

(2) When airport construction, runway repairs, etc., are being performed in the general glide slope area without a facility shutdown and any doubt of facility reliability exists.

(3) Critical component modification or replacement, including transmitters as units, bridges, modulator troughs or parts, power dividers, phasers, transmission line and antennas.

(4) Antenna servicing, repair and repositioning.

(5) Changes in modulator unit adjustments (other than those required to accomplish maintenance routines, followed by return to pre-existing conditions).

(6) Removal of equipment to accomplish site check and reinstallation of that set of equipment.

203 TACAN (Tactical Air Navigation) System

203.1 Description

The TACAN system provides omnidirectional azimuth and distance information to an aircraft for short range remote enroute air navigation. It has the capability of being used as an instrument letdown and approach aid. TACAN ground equipment consists of either a fixed or mobile transmitting unit. The airborne unit in conjunction with the ground unit reduces the transmitted signals to a visual presentation of both azimuth and distance information. TACAN is a pulse system and operates in the UHF band of frequencies from 960 to 1215 MHz.

203.2 Tabulation of Standards and Tolerances

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(1) Reference Burst Pulse Count (Pulses per Second).	1,800	Same as standard	Same as standard.
(2) North Burst Pulse Pairs	12 pr	Do	Do.
(3) North Burst Pulse Duration (1st to 23rd Pulse).	330 μsec	±5 μsec	±10 μsec.
(4) Auxiliary Burst Pulse Pairs	6 pr	Same as standard	Same as standard.
(5) Auxiliary Burst Duration (1st to 11th Pulse).	120 μsec	±1 μsec	±2 μsec.
(6) Identification Tone (Continuous) and Burst Pulse Count.	6,660 pps	Same as standard	Same as standard.
(7) Beacon Receiver Sensitivity [1]	—95 dBm min	Do	Do.
(8) Beacon Receiver Selectivity:			
a. Acceptance at ±160 kHz	Same receiver sensitivity as when on frequency.	Receiver sensitivity within 3 dB of on-frequency sensitivity.	Same as initial.
b. Rejection at ±900 kHz	No replies to off-frequency interrogations.	Not more than 25 replies to 400 off-frequency interrogations at —30 dBm.	Do.
(9) Beacon Receiver Decoder Acceptance Spacing.	No change in receiver sensitivity as interrogation spacing varied from 11.5 thru 12.5 μsec.	No more than 0.5 dB change in receiver sensitivity as pulse spacing varied 11.5 thru 12.5 μsec.	No more than 1 dB change in receiver sensitivity as pulse spacing varied 11.5 thru 12.5 μsec.

[1] Minimum effective triggering level at the facility antenna that will provide 60% replies. Equivalent *receiver* triggering level is function of cable losses, antenna gain, etc.; and must be established for each type facility configuration.

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(10) Receiver Sensitivity Monitor Alarm Level.[2]	−89 dBm	Same as Standard	Same as standard.
(11) Beacon Reply Delay	50 μsec	±1 μsec	±1 μsec.
(12) Monitor Reply Delay Alarm	Alarm at 49 μsec and 51 μsec.[3]	Same as standard	Same as standard.
(13) Beacon Pulse Spacing	12 μsec	±0.25 μsec	Same as initial.
(14) Monitor Pulse Spacing Alarm	Alarm at 11 μsec and 13 μsec.[4]	Same as standard	Same as standard.
(15) Beacon Pulse Width	3.5 μsec	±0.5 μsec	Same as initial.
(16) Beacon Squitter Count	2,700 pulse pairs per second.	±30 pulse pairs per second.	±90 pulse pairs per second.
(17) Beacon Spectrum @ ±0.8 MHz	55 dB min	Same as standard	52 dB min.
@ ±2 MHz	60 dB min	do	55 dB min.
(18) Beacon Peak Power Output[5]	7 kW	5 kW min	3.5 kW min.
(19) Monitor Peak Power Alarm[5]	3.5 kW min. (3 dB decrease from standard).[6]	Same as standard	Same as standard.
(20) Monitor Average Power Alarm[7]	3 dB decrease	Max. decrease of 3 dB	Max. decrease of 3 dB.
(21) Monitor Azimuth Error Alarm:			
15 Hz (course error)	±4.5°	Same as standard	Same as standard.
135 Hz (fine error)	±1°	Do	Do.
(22) Monitor Identity (OFF) Alarm	Alarm when ident. removed for 2 minutes.	2 to 2¼ min	2 to 2½ min.

[2] Minimum effective triggering level at the facility antenna that will provide 60% replies. Equivalent *receiver* triggering level is function of cable losses, antenna gain, etc.; and must be established for each type facility configuration. Alarm at −83 dBm at those facilities employing MX–1627 or MX–2229 monitors until monitors are modified or replaced.

[3] Alarm at 45 μsec and 55 μsec at those facilities employing MX–1627 or MX–2229 monitors until monitors are modified or replaced.

[4] Alarm at 9 μsec and 15 μsec at those facilities employing MX–1627 or MX–2229 monitors until monitors are modified or replaced.

[5] Those equipments which are designed for operation at less than these power levels may be certified at the lower power levels contingent upon meeting all coverage requirements as verified by flight inspection.

[6] Alarm at 8 dB decrease from standard beacon peak power output at those facilities employing MX–1627 or MX–2229 monitors until monitors are modified or replaced.

[7] Not applicable at those facilities employing MX–1627 or MX–2229 monitors.

203.3 Flight Inspection Requirements

203.31 A flight inspection will be required upon any change in the ground equipment or ground environment which cannot be adequately ground checked for its effect on facility accuracy, continuity and reliability. The flight inspection may be abbreviated at the discretion of the Flight Inspection Specialist to include only pertinent features of the commissioning flight check.

Examples of changes that will require a flight inspection are as follows:

(a) Changes in ground equipment:

(1) Antenna replacement or major antenna repair (such as replacement of an antenna central array and/or modulating cylinder).

(2) Frequency (channel) change.

(3) Replacement of beacon and/or monitoring equipment.

(4) Relocation of antenna.

(b) Changes in ground environment:

(1) Nearby construction which may affect operation.

(2) Significant changes in vegetation growth near a facility.

204 Low/Medium Frequency Radio Range (L/MFR)

204.1 Description

The L/MFR is a transmitting station which radiates directional radio beams to provide directional guidance for aircraft. It may also be used as an aid for low approach to the airport. Normally operating in the 200 to 415 kHz frequency band, the L/MFR produces four courses which project radially from the station like spokes from the hub of a wheel. The L/MFR produces these courses by radiating two interlocking figure-eight field patterns. Within limits, these courses can be adjusted to furnish any desired alignment, however, the field pattern is such that the courses are not completely independent of one another. The realignment of one course affects the alignment of the other three courses. Normally, a 75 MHz station location marker called the Z marker is also installed at radio range stations to give a visual and aural indication when an aircraft passes over the station. Performance standards and tolerances for the Z marker are given under the 75 MHz Marker Equipment Section (206).

204.2 Tabulation of Standards and Tolerances

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(1) Frequency and Modulation Tolerances:			
(a) Transmitter Frequency	Assigned Frequency	±0.01%	±0.01%.
(b) Crystal Frequency difference of simultaneous type facilities.	1,020 Hz	±20 Hz @ low end of band. ±55 Hz @ high end of band.	±25 Hz @ low end of band. ±60 Hz @ high end of band.
(c) Audio Response Requirements, 250 to 2,500 Hz, after equilization; (within).	0 dB	4 dB	6 dB.
(d) Nonsimultaneous Course Information Modulating Frequency (Hz).	1,020 Hz	±20 Hz	±25 Hz.
(e) Nonsimultaneous Course Information Modulation.	95%	90 to 100%	90 to 100%.
(f) Nonsimultaneous Range Voice Modulation.	90%	85 to 95%	85 to 95%.
(g) Simultaneous Range Space Modulation.	30%	28 to 32%	28 to 32%.
(h) Simultaneous Range Voice Modulation	55%	52 to 58%	50 to 60%.
(2) Transmitter:			
(a) Power Output [1]	Assigned power	90% of std., min	75% of std., min.

[1] As measured with input supply voltage adjusted to specified equipment input voltage.

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(3) Monitor (if installed):			
(a) Alarm Occurs with Range Power reduction of.	50%	45 to 55%	40 to 60%.
(4) Course Alignment and Ground Check Points:			
(a) Course Alignment by Ground Check. Maximum deviation from published bearings.	0 degrees	±1 degree	±1.5 degrees.
(b) Maximum variation of actual course location found by ground check as compared to flight inspection data when plotted on a chart.	±1 degree	Same as standard	±1.5 degrees.

204.3 Flight Inspection Requirements

204.31 A flight inspection will be required if an L/MFR facility does not meet the initial ground check tolerances outlined in Section 204.2(4) after the following maintenance procedures are performed:

(1) Retune phone antenna at nonsimultaneous loop range facilities and retune center towers at Adcock tower facilities.

(2) Make minor retuning adjustments to antenna tuning house secondaries to correct for normal changes in reflected impedance.

(3) Perform tests which require temporarily moving (and then resetting) the goniometer dial or tuning control to settings other than their normal operating positions.

(4) Replace course shifting resistors in the coupling unit.

(5) Make changes in tower spark-gap settings. (The antenna tuning house transformer secondaries should always be retuned after making this adjustment.)

(6) Install or remove structures from the range plot.

(7) Adjust keyer or link circuit relay.

(8) Adjust SRA and SMRL space modulation (carrier to sideband current ratios).

(9) Retune goniometer circuits.

(10) Make adjustments to coupling unit pickup of the automatic range monitor.

(11) Make corrective adjustments to the carrier down lead at SMRL facilities.

204.32 A flight inspection will be required, regardless of ground check results, after the following maintenance activities are performed:

(1) Repair artificial lines.

(2) Retune the primary circuits of towers, except center towers.

(3) Repair or replace transmission lines.

(4) Make major repairs or alterations to counterpoise, ground radial systems or antenna.

(5) Repair or replace any coil or capacitor in the primary circuits of a tower tuning house.

205 Nondirectional Radio Beacon (NDB)

205.1 Description

The NDB transmits nondirectional signals whereby the pilot of an aircraft equipped with a loop antenna can determine his bearing and "home" on the station. These facilities normally operate in the frequency band of 200 to 415 kHz, however, frequencies may be assigned up to 1800 kHz. They transmit a continuous carrier with 1020 Hz modulation keyed to provide identification except during voice transmission.

205.2 Tabulation of Standards and Tolerances

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(1) Transmitter Carrier Frequency	Assigned frequency	±0.01%	Same as initial.
(2) Identification Oscillator Frequency	1,020 Hz	±50 Hz	Do.
(3) Modulation Levels:			
(a) NDB Nonsimultaneous (except HH Facilities):			
Voice	70%	65 to 70%	Do.
Tone	70%	65 to 70%	Do.
(b) HH Facilities: [1]			
Voice	40%	38 to 42%	35 to 45%.
Tone	40%	38 to 42%	35 to 45%.
(c) NDB Simultaneous (Includes Compass Locators LMM, LOM):			
Voice	70%	68 to 72%	65 to 75%.
Tone	20%	17 to 21%	15 to 22%.
(d) Converted L/MF Range (H Facility):			
Voice	60%	58 to 62%	55 to 65%.
Tone	20%	17 to 21%	15 to 22%.
(4) Monitoring (RF Alarm Level)	50% power reduction	50% power reduction	60% power reduction.
(5) Output Power Ratings:			
(a) Class HH [1] 2,000 watts or over	As required to meet the specified coverage as determined by Flight Inspection.	±10%	±10%.
(b) Class H, MLOM 50 to 2,000 watts	Same as (5)(a) above	±10%	±10%.
(c) Class MH, MLOM 25 to 50 watts	Same as (5)(a) above	±10%	±10%.
(d) Compass Locators (LMM, LOM). Not more than 25 watts.	Same as (5)(a) above	±10%	±10%.

[1] Due to various types of transmitter installations at specific locations modulation levels may be adjusted either as low as 30% or as high as 85% nominal modulation. In these cases initial and operating tolerances shall be adjusted proportional to nominal levels.

205.3 Flight Inspection Requirements

205.31 A flight inspection will be required after the accomplishment of any of the following:

(1) Change in the output level for the purpose of increasing or decreasing its service area.

(2) Changes in the antenna or transmitter which may affect facility coverage.

206.3 Flight Inspection Requirements

206.31 A flight inspection will be required after the accomplishment of the following maintenance procedures:

(1) Any changes or adjustments to transmitter equipment, transmission lines and/or antenna aray which may affect the radiated pattern in terms of its shape or coverage.

206 Marker Beacon (75 MHz)

206.1 Description

A marker beacon serves to identify a particular location in space along an airway or on the approach to an instrument runway. This is done by means of a 75 MHz transmitter which transmits a directional signal to be received by aircraft flying overhead. These stations, commonly called markers, are generally used in conjunction with Low Frequency Radio Ranges and the Instrument Landing System as point designators. Four classes of markers are now in general use: the class FM, the class LFM, the station location or Z-Markers, and the ILS marker beacons. All four classes use crystal controlled transmitters. The transmitted signal is directed upward by means of a directional antenna array with a counterpoise beneath.

206.2 Table of Standards and Tolerances

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(1) Carrier Frequency	75 MHz	±0.01%	±0.01%.
(2) Modulation Level	100%	97 to 100%	95 to 100%.
(3) Monitor Transfer	25% reduction in power or modulation.	25% reduction in power or modulation.	20 to 30% reduction in power or modulation.
(4) Modulation Frequencies:			
(a) FM and LFM	3,000 Hz	±15 Hz	±30 Hz
(b) Z Markers	3,000 Hz	±15 Hz	±30 Hz
(c) ILS Outer Marker	400 Hz	±1 Hz	±4 Hz
(d) ILS Middle Marker	1,300 Hz	±3 Hz	±13 Hz
(e) ILS Inner Marker	3,000 Hz	±8 Hz	±30 Hz
(f) ILS Localizer Back Course Markers.	3,000 Hz	±8 Hz	±30 Hz

210 Radar Facilities

210.1 Introduction

A Radar Facility, as used here, includes any system, any part of any system, or any ancillary equipment that is used by the FAA Air Traffic Service in the National Airspace System. It will include enroute, terminal, precision, and secondary radar systems such as long/medium range surveillance radars exemplified by the AN/FPS–8, AN/FPS–20A, AN/FPS–37, ARSR–2, etc.; airport surveillance and precision approach radars exemplified by the AN/FPN–28, AN/MPN–5, AN/CPN–4, ASR–5 (AN/FPN–47), PAR–2, AN/MPN–11, etc.; and secondary surveillance radar exemplified by AN/GPX–8, AN/UPX–1, AN/GPX–9B, ATCBI–1, etc.

210.2 Definition

The composition of each Radar Facility will be defined for each individual case by listing exactly the affected equipments and/or components in the local interagency agreement which accomplishes the fact of FAA use. Such a local agreement will be part of the record at the Radar Facility as well as at the using facility (an FAA Air Route Traffic Control Center, for example). Thus, both the users and the maintainers of any Radar Facility will use a specific, exact, and common definition.

210.3 General Requirement

Any radar system that is the property of and is maintained by the Department of Defense or United States Coast Guard and that is to be used by the FAA in the National Airspace System, must be flight inspected in accordance with Par. 104.2 of the United States Standard Flight Inspection Manual (USSFIM), FAA OA P 8200.1, Army TM 11–2557–25, Navy NAVWEPS 16–1–520, USAF AFM 55–8, USCG CG–317. In complying with the requirements of Par. 106.21(2) of the USSFIM, the particular radar system to be flight inspected will have been tuned, calibrated, adjusted, and all measurements taken to insure that the radar is operating in accordance with the applicable technical orders, manuals, and any applicable interagency agreements. A record of such actions and measurements will have been made. This record will be the basis for the daily and quarterly certification that the facility meets performance and operational requirements as in Par. 301 and 301.2 of this manual.

210.4 USAF (ADC)/FAA Joint-Use

1. In addition to the consideration in Par. 210.2 above, ADC/FAA Long Range Radars that are to feed military and FAA facilities are subject to joint evaluation as directed in the publication ADCM 101–1, FAA CA 6430, "Joint ADC/FAA Ground Radar Evaluation Manual." The Joint Evaluation will be the basis for establishing the technical standards to which a facility must be maintained, as well as the basis for daily and quarterly certification as in Par. 301 and 301.2 of this manual.

2. The Maintenance Engineer in Charge (EIC) at the FAA Air Route Traffic Control Center will will be responsible for *system* certification to the ATC Chief of the Center of a joint-use Radar, based on:

(a) Certification by him of the components of the system that are located at the Center; e.g., remoting equipment termination, video distributors, decoders, display equipments, etc.

(b) Certification by him of the system (PPI) sensitivity, where applicable, in accordance with SM P 6340.2, Section 3, Paragraph 86.

210.5 Flight Inspection Requirements

(1) In addition to the flight inspection directed in Par. 210.3 above, there will be periodic operational checks of the radar system performed by FAA Jet and Semi-Automatic Flight Inspection (SAFI) aircraft in conjunction with the FAA air traffic controller. These checks will supplement the performance assurance obtained through daily operational observation of the system. The checks will be made as follows:

(a) Observation of identified targets under control within the sector and comparing them

against data obtained during the commissioning flight inspection or through minimum performance requirements developed at the facility.

(b) Checking the accuracy of as many of the predetermined checkpoints as possible while SAFI or FAA jet flights are operating within the area of radar coverage.

(2) Special flight inspections will be accomplished in accordance with Par. 104.4 of the USSFIM. A special flight inspection will be called for under the following conditions:

(a) When a reported deficiency is not susceptible to exact measurement or to verification by ground measurement.

(b) After an aircraft accident in which the Radar Facility may have been involved.

(c) After an antenna change, antenna tilt change, or when engineering judgement indicates a probable change in antenna radiation pattern. On a terminal type radar with a variable tilt antenna and remote tilt indicator, the normal tilt shall be that tilt established during a flight inspection. This type of radar shall be considered as not certified for use in the National Airspace System at any time there is a deviation from this tilt and shall not be utilized by the FAA until normal tilt is restored.

(d) After a modification or other circumstance that, in the judgement of the Engineer in Charge, makes it necessary for recertification of facility performance.

(e) After the installation of a new map overlay or video map plate to be used for Air Traffic Control purposes, or when navigational aids or fixes have been added or relocated or are otherwise not coincident with an overlay or map plate previously approved.

210.6 Performance Standards

(1) The radar system will be maintained to the standards determined and recorded at the time of the commissioning flight inspection. It will be maintained within tolerances specified in the applicable technical order, manuals, and any applicable interagency agreements.

(2) In addition to the general requirements stated in the preceding paragraph, certification of an equipment or facility shall be based on the measurement of mandatory parameters. These are specified in Tables 210–1, Enroute Radar; 210–2, Terminal Radar; 210-3, Secondary Radar (Beacon); and 210–4, Remoting Equipment. Under each catagory is listed the specific parameters whose measurement is required for certification, followed by a list of specific equipment types, together with the name and/or number of the technical publication that contains the maintenance standards and tolerances.

TABLE 210–1—Enroute Radar

1. Required Measurements

Transmitter

a. Peak Power Output.
b. RF Pulse Alignment.
c. Spectrum Analysis.
d. Pulse Width.
e. VSWR.
f. T/R Recovery Time.
g. Ring Time.

Receiver

a. MDS with parametric amplifier (if installed). (Check MDS on normal, integrated normal and MTI.)
b. Noise Figure.
c. Cancellation Ratio.
d. Sub-Clutter Visibility.
e. Parametric Amplifier Gain.
f. Video Limit Level at Junction Box.

2. Equipment Types and Applicable Technical Documents

Type	*Technical Document*
a. FPS–7, –7A, –7B, –7C and –7D	AF T. O. 31P6–2FPS–7( ) Series.
b. FPS–8	AF T. O. 31P6–2FPS–8 Series, Section 5.
c. FPS–20A, including the FPS–64, –65, –66 and –67.	AF T. O. 31P6–2FPS–20 Series, Section 6.
d. FPS–24	AF T. O. 31P6–2FPS–24 Series.
e. FPS–27	AF T. O. 31P6–21FPS–27 Series.
f. FPS–35	AF T. O. 31P6–2FPS–35 Series.
g. FPS–37	NAVSHIPS 94370A (UNCL), Section 6, Vol. 3.
h. GPS–4	AF T. O. 31P6–2GPS–4 Series.
i. ARSR–1D, –E, –F and ARSR–2	FAA Handbook, SM P 6340.2, Chapter 4.

TABLE 210–2—Terminal Radar

1. Required Measurements

* a. Power Output.
b. Ring Time.
c. Minimum Discernible Signal (normal and MTI).
d. Cancellation Ratio.
e. Output Pulse Spectrum.
f. Video Output Level.
g. Range Accuracy.
h. Azimuth Accuracy.
i. Map Accuracy.
j. T/R Recovery Time. *

2. Equipment Type and Applicable Technical Documents

Type	*Document*
a. AN/CPN–18	AF T. O. 31P5–2CPN–18 Series.
b. AN/FPN–47 (ASR–5)	AF T. O. 31P5–2FPN–47 Series.
c. AN/CPN–4	AF T. O. 31P5–2CPN–4 Series.
d. AN/MPN–11	AF T. O. 31P5–2MPN–11 Series.
e. AN/MPN–13	AF T. O. 31P5–2MPN–11 Series.
f. AN/MPN–14	AF T. O. 31P5–2MPN–14 and –2MPN–11 Series.

Type	Document
g. AN/MPN-15	AF T. O. 31P5-2MPN-11 Series.
h. AN/MPN-16	AF T. O. 31P5-2MPN-14 and -2MPN-11 Series.
i. AN/MPN-17	AF T. O. 31P5-2MPN-17, -2MPN-11, -2MPN-14, and -2MPN-17 Series.
j. AN/FPN-16	AF T. O. 31P5-2FPN-16 Series.
k. AN/FPN-28 (MPN-5)	NAVSHIPS 92633 and NAVSHIPS 91924(A).42.
l. AN/CPN-4A, MPN-11E, MPN-14A, AN/FPN-48, 49, and 50 (CPN-4).	NAVWEPS 16-30 CPN-4-4, -5, -6, -7, -8, and -9.
* m. AN/FPN-36, AN/FPN-40	NAVSHIPS 937.42, TM 11-5840-293-35. *

TABLE 210-3—Secondary Radar

1. Required Measurements

Transmitter	Receiver
a. Pulse width of each pulse.	a. Sensitivity.
b. Pulse spacing of all pulses (each mode).	b. Noise figure.
c. Power output of each pulse.	c. Video output.
d. Monitor alarm point.	d. Receiver gain monitor alarm point.
e. Range error alarm.	
f. Trigger spacing.	

2. Equipment Types and Applicable Technical Documents

Type	Document
a. ATCBI-1	Manufacturers Instruction Book.
b. ATCBI-2	Manufacturers Instruction Book.
c. ATCBI-3	Manufacturers Instruction Book.
d. AN/GPX-8A	AF T. O. 31P4-2GPX-8( ) -2, Section 5.
e. AN/GPX-9B	AF T. O. 31P4-2GPX-9( ) -2, Section 5.
f. AN/UPX-6	AF T. O. 31P4-2UPX-6-2, Section 5.
g. AN/UPX-14	AF T. O. 31P4-2UPX-14-2, Chapter 5.
h. AN/UPX-1	NAVSHIPS 91343.
i. AN/UPX-1A	NAVSHIPS 91765.
j. AN/GPX-30	NAVSHIPS 93578.
k. AN/GPX-34	NAVSHIPS 93885.
l. AN/GPX-35	NAVSHIPS 94177.
m. AN/TPX-41	TM 11-1193.

TABLE 210-4—Remoting Equipment

Type	Document
a. AN/FST-2	AF T. O. 31S1-2FST-2-2, Section 5, Paragraphs 5-3, 5-24.
b. RML-1, -2, -3 and -4	FAA Handbook, SM P 6350.1, Chapter 4.
c. MRR-4	NAVSHIPS 93515—Motorola Handbook of instructions, MRR-4 Microwave.
* d. OA-2032/FPN-33 and AM-1577/FPN-33	TM 11-5840-293-12, NAVWEPS 1630-FPN-36-1. *

221 Enroute and Terminal Area Communications Facilities

221. Description

Enroute and terminal area communications are provided by various types of air/ground facilities such as air route traffic control centers (ARTCC), flight service stations (FSS), control towers, etc. The facilities consist of air/ground transmitter and receiving equipment, recording equipment, and the necessary control equipment.

221.2 Tabulation of Standards and Tolerances

All communications equipment must meet the standards and tolerances outlined in the applicable T.O.; instruction book; or FAA handbook. The following is a list of equipment parameters which shall be measured:

221.21 Transmitter and Associated Antenna

(1) Power output at transmitter.
(2) Power input at antenna.
(3) Audio frequency response.
(4) VSWR at transmitter.
(5) VSWR at antenna.
(6) Modulation percentage.
(7) Audio limiting action.
(8) Output frequency.
(9) Inter-modulation and cross-modulation between transmitters capable of simultaneous operation.
(10) Audio distortion.

221.22 Receiver and Associated Antenna

(1) Sensitivity vs. output level.
(2) Signal-to-noise ratio.
(3) Squelch action.
(4) AVC threshold.
(5) AVC regulation of audio level.
(6) Power output capability.
(7) Selectivity (at 6 dB and 60 dB points).
(8) Nonsymmetry (at 6 dB and 60 dB points).
(9) Receiving frequency.
(10) Audio frequency response.
(11) Audio distortion.
(12) Insulation resistance of antenna system.
(13) Continuity of antenna system.

221.23 Recorders and Reproducers

(1) Frequency response.
(2) Signal-to-noise ratio.
(3) Crosstalk.
(4) Mechanical tolerances, if appropriate.
(5) Bias oscillator level, if appropriate.
(6) Amplifier gain.
(7) Audio quality.
(8) Automatic changeover, if appropriate.

221.24 Audio and Switching System

(1) Gain of each amplifier.
(2) Frequency response of each amplifier.
(3) Signal-to-noise ratio of each amplifier.
(4) Amplifier limiting action, if appropriate.
(5) Audio level at input and output of each amplifier in the system and at such other points that are appropriate.
(6) Interchannel crosstalk.
(7) Noise level of each channel.

221.3 Applicable technical documents

Equipment	*Technical Document*
(1) Transmitters	Appropriate T.O.; equipment instruction book; or FAA Handbook SM P 6500.2, Chapter 4.
(2) Antennas and Transmission Lines (Receiving and Transmitting).	Appropriate T.O.; equipment instruction book; or FAA Handbook SM P 6500.8, Chapter 4.
(3) Receivers	Appropriate T.O.; equipment instruction book; or FAA Handbook SM P 6500.7, Chapter 4.
(4) Recorders and Reproducers.	Appropriate T.O.; equipment instruction book; or FAA Handbook SM P 6500.3, Chapter 4.
(5) Audio and Switching Systems.	Appropriate T.O.; equipment instruction book; or FAA Handbook 6500.4, Chapter 4.

221.4 Flight Inspection Requirements

221.41 All maintenance procedures of the communications facility can be accomplished and the facility returned to unrestricted operation without recourse to a flight inspection.

222 Direction Finding Stations (DF)

222.1 Description

Direction finding stations using standard communications from aircraft, provide bearing information to ground personnel which can be relayed to an aircraft upon request from the pilot. DF Stations operate in the HF, VHF, and UHF range.

222.2 Tabulation of Standards and Tolerances

Item	*Standard*	*Initial Tolerance/Limits*	*Operating Tolerance/Limits*
(1) Bearing Accuracy Ground Inspection.	As established by survey.	±4° of value established following commissioning flight inspection.	±4° of value established following last flight inspection.

222.3 Flight Inspection Requirements

222.31 A flight inspection will be required for any of the following reasons:

(1) When the DF Antenna is replaced.

(2) If a report is received from a pilot or from AT personnel that a facility has errors exceeding ± 10 degrees and the report is verified by a bearing check of another aircraft in the same vicinity. A confirming flight inspection is required, even though the error cannot be verified by ground or equipment checks.

(3) When a facility is recommissioned following an extended interruption, modernization, or replacement of any bearing determining component.

* 300 Facility Ground Inspection and Notice to Airmen Procedures *

300.1 Introduction

All military air traffic control and navigational aid facilities which have been designated for use in the National Airspace System, shall be ground inspected in accordance with Section 301 and certified by the cognizant authority as meeting the applicable technical performance standards and tolerances established by this manual. Those facilities not meeting the prescribed standards and tolerances as determined by flight inspection and/or ground inspection will be the subject of a * Notice to Airmen in accordance with paragraph 302.

301 Facility Ground Inspection, Certification and Recertification Procedures *

Facility ground inspection consists of the collecting and recording of appropriate performance data, inspection of facility physical conditions, and a review of the quality of maintenance procedures to determine that the facility is operating within performance tolerances and can therefore reasonably be expected to continue to function properly. The cognizant maintenance authority will be responsible for conducting the ground inspection and assuring that the facility meets the performance standards and tolerances described herein. Based upon this assurance, the cognizant Military authority will forward to the * appropriate FAA air traffic operational authority a formal certificate essentially the same as that shown in paragraph 402. Recertification is based on similar ground inspection procedures; however, a formal certificate is not required to be sent the FAA air traffic operational authority. Recertification shall be accomplished in accordance with the ground recertification intervals of paragraph 301.1 and at such times that a facility is restored to a satisfactory operational condition after having been advertised in accordance with paragraph 302. *

301.1 Ground Recertification Interval

Recertification shall be performed at intervals specified in the following table:

Facility	*Ground Certification Interval*
VOR/TVOR	Four-month intervals.
ILS	Two-month intervals.
TACAN	Four-month intervals.
L/MFR	Semiannually.
NDB	Do.
Marker Beacons, 75 MHz.	Do.
Enroute and Terminal Area Communications.	Do.
DF	Four-month intervals.
Enroute Radar	Do.
Terminal Radar	Two-month intervals.
Secondary Radar	Four-month intervals.
Any Facility	Immediately after an aircraft accident in which the facility may have been involved.

301.2 Additional Requirements

Facilities should be visited frequently enough to ensure accurate and reliable operation in accordance with the criteria established in this manual. Each time a facility is visited, the maintenance technician responsible for the facility shall verify facility performance on the basis of one or more of the following criteria:

(1) Visual and Aural (every visit). Verify by visual and aural observation that equipment is operating normally. This requirement includes, but is not limited to, observations noting meter readings, pilot light indications, extraneous noises, excessive heat, etc.

(2) Monitoring (scheduled visits and as required). Verify by noting local monitoring information and determining from this information that facility operation is satisfactory. Verification may include a control line check to

determine that control and remote monitor functions are satisfactory.

(3) Meter Readings (scheduled visits if applicable). Record meter readings and compare with those previously recorded on station records.

(4) Determine (on scheduled visits, and as required) that facility meets the performance standards and tolerances established in this manual.

(5) System Ground Check (scheduled visits and as required). Perform ground check and compare results with reference ground check error curve (VOR) and/or with data obtained at the time of the last previous flight inspection. Evaluate this data and determine that facility performance has not departed appreciably (beyond tolerance) from previous system ground check recordings.

(6) Flight Inspection (scheduled or requested). On the basis of flight inspection evaluation, determine that facility performance is satisfactory. Ground check data shall be recorded immediately following any flight inspection.

*** 302 Notice to Airmen Procedures ***

When it has been determined, either by flight inspection or ground inspection, that a facility does not meet prescribed technical performance standards or tolerances, the cognizant maintenance technician shall notify the Air Traffic Control Officer having operational jurisdiction over the facility and provide appropriate tech- * nical information on which to base a Notice to Airmen. In addition to any Military Notice to Airmen action, the appropriate FAA authority shall be notified and will issue any Civil Notice to Airmen required.

Notices to Airmen related to Air Defense Radar Systems are subject to classification restrictions and shall be prepared in accordance with joint ADC/FAA Ground Rules Memorandum of Agreement and Agency Handbook OA P 1600.2, Chapter 16, Paragraph 7. Mutually agreed upon Notice to Airmen phraseology for Air Defense Radars will be incorporated in the local agreement.

Scheduled maintenance shutdowns of military facilities which have been certificated for use in the National Airspace System will be submitted to the appropriate Air Route Traffic Control Center (ARTCC) for concurrence in sufficient time to allow for Notice to Airmen issuance at * least five hours prior to the shutdown.

400 APPENDIX

401 Glossary and Definitions

1. *National Airspace System.* The common system of air navigation and air traffic control encompassing communication facilities, air navigation facilities, airways, controlled airspace, special use airspace and associated flight procedures authorized by Federal Aviation Regulations for domestic and international aviation.

2. *Air Navigation Facility.* Any facility used in, available for use in, or designated for use in the aid of air navigation, including landing areas, lights, any apparatus or equipment for disseminating weather information, for signaling, for radio/directional finding, or for radio or electrical communication, and any other structure or mechanism having a similar purpose for guiding or controlling flight in the air or for the landing and takeoff of aircraft.

3. *Air Traffic Control Facility.* A facility providing air traffic control service.

4. *Ground Inspection.* The act of technically evaluating an Air Navigation Facility, by competent technical personnel, using appropriate test equipment, in order to determine if facility meets applicable performance standards as outlined in Section 200 of this manual.

* 5. *Certification.* The act performed by the cognizant military authority in giving a formal certificate to the appropriate FAA air traffic operational authority to affirm that an air navigation facility meets applicable performance standards as outlined in Section 200 of this Manual.

6. *Recertification.* The act performed by the cognizant military authority in locally recording an affirmative that an air navigation facility meets applicable performance standards as outlined in Section 200 of this Manual.

7. *Formal Certificate.* A written statement, based on the satisfactory completion of the initial air navigation facility ground inspection, giving formal notice to the appropriate FAA air traffic operational authority that a facility meet applicable performance standards as outlined in Section 200 of this Manual and agreeing to issue a Notice to Airmen should the facility subsequently fail to meet applicable ground or flight inspection criteria. See Appendix 402 of this Manual for the formal certificate form.

8. *Ground Check.* A method of verifying from the ground that a facility is radiating accurate information.

9. *Notice to Airmen.* A notice identified either * as a NOTAM or Airmen Advisory containing information concerning the establishment, condition, or change in any component of, or hazard in, the National Airspace System, the timely knowledge of which is essential to personnel concerned with flight operations.

a. *NOTAM.* A notice to Airmen in message form requiring expeditious and wide dissemination by telecommunications means.

b. *Airmen Advisory.* A notice to Airmen normally only given local dissemination during, preflight or inflight briefing, or otherwise during communication with pilots.

* 10. *VOR.* VHF Omnidirectional Radio Range.

11. *TVOR.* Terminal VOR.

12. *ILS.* Instrument Landing System.

13. *TACAN.* Tactical Air Navigation System.

14. *L/MFR.* Low/Medium Frequency Radio Range.

15. *NDB.* Non-Directional Beacon.

16. *FM, LFM, Z Markers, ILS Marker.* 75 MHz marker beacons.

17. *DF.* Direction Finding Equipment. *

* 402 Formal Certificate Form

The following certificate shall be completed at the time of initial certification when the facility is accepted for use in the National Airspace System and forwarded to the proper Federal Aviation Administration official:

CERTIFICATE

The undersigned hereby attests that (name of facility) meets applicable performance standards and tolerances contained in the United States Interagency Ground Inspection Manual and agrees to immediately issue a Notice to Airmen through (name of FAA facility) should the facility subsequently fail to meet applicable ground or flight inspection criteria. In the latter event, it is understood that continued military use of the facility for IFR operations will be disapproved by the Federal Aviation Administration if conflict with other IFR traffic could result. *

Signature: _____

Title: _____

Date: _____

403 FAA Regional Offices and Addresses

Alaskan Region	632 Sixth Avenue Anchorage, Alaska 99501
Central Region	601 East 12th Street Kansas City, Mo. 64106
Eastern Region	John F. Kennedy International Airport Federal Building Jamaica, N.Y. 11430
Europe-Africa-Middle East	Amembassy—FAA Tour-Madou Building 1 Place Madou, Brussels 3, Belgium APO New York 09667
Pacific Region	Post Office Box 4009 Honolulu, Hawaii 96812
Southern Region	Post Office Box 20636 Atlanta, Ga. 30320
Southwest Region	Post Office Box 1689 Fort Worth, Tex. 76101
Western Region	5651 West Manchester Avenue Post Office Box 90007, Airport Station Los Angeles, Calif. 90009

CHANGE

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

6000.6
CHG 1

1/9/71

Cancellation Date: after filing

SUBJ: UNITED STATES INTERAGENCY GROUND INSPECTION MANUAL - AIR TRAFFIC CONTROL AND NAVIGATIONAL AID FACILITIES

1. PURPOSE. This change transmits revised pages to the subject manual.

2. EXPLANATION. The revised pages eliminate a conflict between the subject manual and agency Order 6000.1A, dated 8 March 1968, entitled "Certification and Operation of Military-Maintained Air Navigation Facilities in the National Airspace System". Upon issuance of this Change, a formal written certificate will be required only once; at the time a facility is accepted for use in the National Airspace System. In addition, other revisions include: the addition of the quad-radar system, minor changes in radar performance measurements and a change in ground check error spread tolerance for certain VOR equipment.

PAGE CONTROL CHART

Remove Pages	Dated	Insert Pages	Dated
Foreword	4/67	Foreword	1/9/71
Page i	4/67	Page i	1/9/71
Page 3-4	4/67	Page 3-4	1/9/71
Page 5-6	4/67	Page 5-6	1/9/71
Page 27-28	4/67	Page 27-28	1/9/71
Page 33-34	4/67	Page 33-34	1/9/71
400 Appendix, Page 1-2	4/67	400 Appendix, Page 1-2	1/9/71

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